



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/583,904

01/16/2007

Cha P. Doh

200400048

8936

7590
Timothy J King
Entegris Inc
129 Concord Road
Billerica, MA 01821-4600

05/12/2010

EXAMINER

MCKINNON, TERRELL L

ART UNIT

PAPER NUMBER

3744

MAIL DATE

DELIVERY MODE

05/12/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/583,904	Applicant(s) DOH ET AL.	
	Examiner TERRELL L. MCKINNON	Art Unit 3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 January 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>6/22/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 7-14, 21-29, 30-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyamoto (JP 05049875) in view of Eguchi (EP 0706818).

Re. Cl. 7, Miyamoto discloses an exchange device comprising:
one or more thermoplastic hollow conduits fused at a first end portion of the thermoplastic hollow conduits to a first thermoplastic resin; said first thermoplastic resin fused to one or more structures interconnected by slots on an interior surface of a first sleeve or to a first end of a thermoplastic housing in a terminal end block structure; and a second end portion of the thermoplastic hollow conduits fused at a second end portion with a second thermoplastic resin; said second thermoplastic resin fused to one or more structures interconnected by slots on an interior surface of a second sleeve or to a second end of the thermoplastic housing in a terminal end block structure (a mass exchanger with thermoplastic hollow fibers (polyethylene) and a thermoplastic housing (polycarbonate) (see [0014] of the computer translation provided by the Japanese Patent Office) wherein the fibers (2) are bonded into a tube sheet (4) and the tube sheet is fixed to the housing (1) by means of several grooves (1-1). The fibers are subsequently opened (fig.3)).

Re. Cl. 8, Miyamoto discloses the structures are protrusions, grooves, or a combination of these (see Figs).

Re. Cl. 9, Miyamoto discloses structures are grooves in the surface of the housing or sleeves (see Figs).

Re. Cl. 10, Miyamoto discloses the device further comprises a sintered thermoplastic coating on the inside of the sleeve or housing.

Re. Cl. 11, Miyamoto discloses housing or sleeve includes fluid fittings (see Figs).

Re. Cl. 12, Miyamoto's invention fails to disclose having two or more grooves in the housing or sleeves wherein the grooves are interconnected by vent channels. addresses the problem of venting of the grooves as it discloses that an angle of at least 3° has to be foreseen in order to prevent that resin is excluded from a groove (see § [0008] of the computer translation of the Japanese Patent Office).

However, Eguchi teaches having two or more grooves in the housing or sleeves wherein the grooves are interconnected by vent channels (The problem to be solved is to prevent the encapsulation of gas during the potting process which would lower the mechanical integrity of the tube sheet by means of an alternative method.

An alternative solution is given by Eguchi. Here the wedge-type protrusions have a means for degassing in forms of interconnecting vent slots (fig.1-6, ref.5 and col.3, ll 45-51). The use of venting slots is thus already known and is in addition not limited to the type of structure (internal or external to the housing wall).

Given the teachings of Eguchi, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the heat exchanger of Miyamoto with having two or more grooves in the housing or sleeves wherein the grooves are interconnected by vent channels.

Doing so would provide an efficient and reliable means of removing unwanted gases and improving the structure of the heat exchanger.

Re. Cl. 13, Miyamoto discloses the thermoplastic hollow conduits are porous hollow fibers, skinned hollow fibers, thermoplastic conduits, co-extruded hollow conduits, or combinations of these.

Re. Cl. 14, Miyamoto discloses the ends of the thermoplastic hollow conduits are opened to fluid flow.

Re. Cl. 21, Miyamoto discloses the obvious method wherein flowing a first fluid to be treated on a first side of one or more thermoplastic hollow conduits flowing an second fluid on a second side of the thermoplastic hollow conduits to transfer mass, energy, or a combination of these is between the first fluid and the second fluids through a wall between a first side and a second side of the thermoplastic hollow conduits.

Re. Cl. 22, Miyamoto discloses the obvious method wherein thermal energy is transferred between the first fluid and the second fluid.

Re. Cl. 23, Miyamoto discloses the obvious method wherein the wall between the first side and the second side of the thermoplastic hollow conduits is non-porous.

Re. Cl. 24, Miyamoto discloses the obvious method wherein the grooves are interconnected to the wall between the first side and second side of the thermoplastic hollow conduits is porous.

Re. Cl. 25, Miyamoto discloses a source of exchange fluid connected to a first fluid inlet of the exchange apparatus device and a source of process fluid connected to a second fluid inlet of the exchange apparatus device, the first and second fluid inlets separated by the thermoplastic hollow conduits, and a fluid controller fluidly connected to an exchanger a second fluid outlet in fluid communication with the second fluid inlet,

Art Unit: 3744

the fluid controller providing provides conditioned fluid to one or more substrates treated by the apparatus.

Re. Cl. 26, Miyamoto discloses the exchanger second fluid outlet in fluid communication with the second fluid inlet provides conditioned fluid to a tank containing one or more substrates.

Re. Cl. 27, Miyamoto discloses the fluid controller is a pump, a dispense pump, or a liquid flow controller.

Re. Cl. 28, Miyamoto discloses the exchange fluid is a source of temperature controlled fluid.

Re. Cl. 29, Miyamoto discloses the substrate to be treated includes silicon
Re. Cl. 8, Miyamoto discloses.

Re. Cls. 30-34, Miyamoto's invention fails to disclose potted thermoplastic hollow conduits in a housing capable of transferring that transfer heat from a first fluid to a second fluid through the walls of the potted thermoplastic hollow conduits, the exchange device is integral at a temperature of at least 100 °C and a pressure of at least 50 psig, the potted thermoplastic hollow conduits having a packing density by volume of the potted thermoplastic hollow conduits in the housing of from between 20 and 70 percent; Re. Cl. 31, the potted thermoplastic hollow conduits having 9 ft² (0.85 m²) of exchange surface area, the exchange device exchanging exchanges at least 13,000 watts of energy between a first fluid flowing on a first side of the potted thermoplastic hollow conduits and a second fluid flowing on a second side of the potted thermoplastic hollow conduits.

Art Unit: 3744

Re. Cl. 32, the first fluid flows at a rate of 9.5 liters per minute or less on a first side of the potted thermoplastic hollow conduits and the second fluid flows at a rate of 5.8 liters per minute or less on the second side of the potted thermoplastic hollow conduits.

Re. Cl. 33 , the device is integral at a temperature of 160 °C and a pressure of 70 psig.

Re. Cl. 34, the device is integral at a temperature of 200 °C and a pressure of 50 psig.

However, Eguchi teaches The exchanger according to example 1 (D1) has a shell with an inner diameter of 61 mm (cf. comparative example 1) and comprises 3.400 potted hollow conduits having an outer diameter of 0.8 mm. The resulting packing density in terms of volume is thus 58%. The exchanger is capable of withstanding pressures of 24.51 bar and temperatures of 120°C or more (col.3, II 40-44).

Given the teachings of Eguchi, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the heat exchanger of Miyamoto with the above mentioned limitations within claims 30-34. Furthermore, the exchange device is in no way limited to any materials or certain manufacturing methods. Thus the skilled man is able to design exchangers fulfilling in operation all of said parameters.

Doing so would provide a structurally sound heat exchanger that's capable of handling pressure and temperature changes without damaging the heat exchanger.

5. Claims 15, 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyamoto (JP 05049875) in view of Eguchi (EP 0706818).as applied to claim(s) above, and further in view of Cheng et al. (US 6,582,496)

Miyamoto's invention as modified by Eguchi, discloses all of the claimed limitations from above except for the co-extruded thermoplastic hollow, conduits include a perfluorinated thermoplastic.

However, Cheng teaches the use of thermoplastic hollow, conduits include a perfluorinated thermoplastic ((col.2, ll 19-47) an exchanger completely made of perfluorinated compounds would be suitable for such problems).

Given the teachings of Cheng, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the heat exchanger of Miyamoto with co-extruded thermoplastic hollow, conduits include a perfluorinated thermoplastic.

. Doing so would provide a thermally efficient material to facilitate heat transfer within the heat exchanger.

6. Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cesaroni et al. (US 6149422) in view of Doh et al. (WO 03/029744).

Re. Cls. 16-18 and 20, Cesaroni, discloses an exchange device comprising one or more co-extruded thermoplastic hollow conduits fused at a first end portion of the thermoplastic hollow conduits to a first thermoplastic resin; said first thermoplastic resin fused to a surface of a first sleeve or to a surface of a first end of a thermoplastic housing in a terminal end block structure; and a second end portion of the one or more co-extruded thermoplastic hollow conduits fused with a second thermoplastic resin; said second thermoplastic resin fused to a surface of a second sleeve or to a surface of a second end of the thermoplastic housing

Art Unit: 3744

in a terminal end block structure (discloses an exchanger made e.g. from fluorocarbon polymers (col.1.6, 1.48), wherein the tubes can be co-extruded to allow for bonding of the outer layer with a tube sheet being part of a plastic heat exchanger(col.2, ll 57-62). Fluid fittings for the shell-side fluid are commonly applied via fittings in the vessel).

Re. Cl. 17, Cesaroni discloses the ends of the co- extruded thermoplastic hollow conduits of the terminal end block structure are opened to fluid flow.

Re. Cl. 18, Cesaroni discloses the housing or sleeve includes fluid fittings.

Re. Cl. 20, Cesaroni discloses where the co-extruded thermoplastic hollow conduits have an inner thermoplastic layer thermally bonded to an inner layers outer thermoplastic layer, the outer thermoplastic layer fusing with the first or second thermoplastic resin in the exchange device.

Re. Cl. 19, Cesaroni's invention fails to disclose an outer layer of the co-extruded thermoplastic hollow conduits includes a thermally conductive material.

However, Doh teaches the use of an outer layer of the co-extruded thermoplastic hollow conduits includes a thermally conductive material (which suggests to impregnate the conduits with a thermally conductive material (Cl.8 &16)

Given the teachings of Doh, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the heat exchanger of Cesaroni with an outer layer of the co-extruded thermoplastic hollow conduits includes a thermally conductive material.

. Doing so would enhance the thermal conductive characteristics of the conduits and improve the overall thermally efficiency of the heat exchanger.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references cited on the PTO892 discloses related limitations of the applicant's claimed and disclosed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TERRELL L. MCKINNON whose telephone number is (571)272-4797. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

May 9, 2010
/Terrell L Mckinnon/
Primary Examiner, Art Unit 3744